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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Beltsville, Maryland

INFORMATION ABOUT BEE CULTURE

Most persons appreciate that the only source of honey and beeswax is the honeybee. Few realize, however, that, although this insect in the United States produces in excess of 200 million pounds of honey and 4 million pounds of beeswax annually, these are merely by-products, and that its principal role is in the pollination of some 50 agricultural crops for the production of seed and fruit. While many other insects are of value as pollinators, their numbers have been so depleted in the course of agricultural development that they can no longer be relied upon. In practically all agricultural areas honeybees are now the most numerous flower-visiting insects. The transfer of pollen from flower to flower is so essential that beekeeping must be carried on to maintain a profitable agriculture.

Many persons own bees, but not enough keep bees efficiently or make bee-keeping a specialty. Efficiency in beekeeping is based upon a thorough knowledge of the life and behavior of bees, the proper use of equipment, and careful attention to marketing problems.

This circular presents in brief form certain information not included in current Government bulletins. If your beekeeping questions are not answered in this and other Department publications, the Bureau of Entomology and Plant Quarantine will be glad to render further assistance.
ADDRESS ALL INQUIRIES TO: Division of Bee Culture, Agricultural Research Center, Beltsville, Maryland.

GOVERNMENT PUBLICATIONS. A limited supply of most of the following publications is available for free distribution; however, all are obtainable by purchase from the SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING OFFICE, WASHINGTON 25, D. C., by postal money order, express order, or New York draft. If currency is sent it will be at sender's risk. Postage stamps, defaced or worn coins, foreign coins, and uncertified checks will not be accepted.

Farmers' Bulletin	961 - Transferring Bees to Modern Hives.....	5 cents
" "	1713 - Treatment of American Foulbrood.....	5 "
Circular No.	386 - The Wax Moth and Its Control.....	5 "
" "	392 - Diagnosing Bee Diseases in the Apiary..	5 "
" "	554 - Honey and Pollen Plants in the United States.....	10 "
" "	650 - Factors Affecting Usefulness of Honeybees in Pollination.....	10 "
" "	702 - Productive Management of Honeybee Colonies in the Northern States.....	10 "
Technical Bulletin	656 - Cost of Producing Extracted Honey in California.....	10 "
" "	716 - Investigations on the Physical and Chemical Properties of Beeswax.....	5 "
Leaflet No.	113 - Honey and Some of Its Uses.....	5 "

COOPERATIVE PUBLICATIONS.

Costs and Practices in Producing Honey in Oregon, by A. S. Burrier, Frank E. Todd, H. A. Scullen, and William W. Gorton.

The Distribution of California Buckeyes in the Sierra Nevada in Relation to Honey Production, by George H. Vansell, William G. Watkins, and L. F. Hosbrook.

A discussion of the Natural History, Management and Diseases of the Honeybee: The Beginner Beekeeper in Louisiana, by E. Oertel.

Nectar and Pollen Plants of Oregon, by H. A. Scullen and G. H. Vansell.

E-SERIES CIRCULARS. Obtainable without cost from the Division of Bee Cultures, Agricultural Research Center, Beltsville, Maryland.

- E-297 - List of Dealers in Beekeeping Supplies, Package Bees, and Queens.
- E-427 - New Recommendations for the Installation of Package Bees, Using a Spray and Direct-Release Method.
- E-495 - Brief Presentation of the Characteristics, Contaminants, Processing, and Uses of Beeswax.
- E-529 - Some Effect of Temperature, Relative Humidity, Confinement, and Type of Food on Queen Bees in Mailing Cages.
- E-531 - The Use of Pollen Traps and Pollen Supplements in Developing Honeybee Colonies.
- E-536 - The Role of Pollen in the Economy of the Hive.
- E-545 - A Report of Investigations of the Extent and Causes of Heavy Losses of Adult Honeybees in Utah.
- E-584 - The Dependence of Agriculture on the Beekeeping Industry.
- E-693 - Two-Queen Colony Management.

SEMI-MONTHLY HONEY REPORT. This report, issued monthly on the 1st and 15th, gives quotations on honey and beeswax, the condition of bees and honey plants, data on imports and exports of honey, and other pertinent economic information relating to beekeeping. Copies are available without cost through the Production and Marketing Administration, Washington 25, D. C.

PRODUCTION STATISTICS. Honey and Beeswax Production; Honeybees: Number of Colonies and Production of Honey and Beeswax, 1945 - January 25, 1946, Bureau of Agricultural Economics, Washington 25, D. C.

UNITED STATES STANDARDS FOR GRADES OF EXTRACTED HONEY, effective March 15, 1943. (These standards supersede the United States Grades recommended by the United States Department of Agriculture in Circular No. 24, issued December 1927 and revised August 1933). Copies are available without cost through the Production and Marketing Administration, Washington 25, D. C.

ORGANIZING HONEY MARKETING COOPERATIVES IN WARTIME. Misc. Rpt. 79, Farm Credit Administration. For copies write to the Director of Information and Extension, Farm Credit Administration, Washington 25, D. C.

MOTION PICTURE FILM. Copies of the motion picture, "The Realm of the Honeybee," may be purchased (in either 35 or 16 millimeter width) through the Motion Picture Section, Extension Service, U. S. Department of Agriculture, Washington 25, D. C. Application for purchase should be sent to that section.

This is a four-reel film showing interesting phases of the life history and behavior of the honeybee. It is replete with close-ups of bees gathering nectar and pollen, performing the "food dance" and driving out drones and robber bees. It shows how bees sting and also records a fatal encounter between rival queens. The film closes showing how honey is removed from the hives and prepared for market, and a few of the ways in which honey can be used.

SLIDEFILMS AND FILM STRIPS. The following series of slidefilms and film strips are available at nominal cost. A price list and instructions for ordering may be obtained from the Visual Instruction Section, Extension Service, U. S. Department of Agriculture, Washington 25, D. C.

The Anatomy of the Honeybee.....	Series 151
Diagnosis of Bee Diseases in the Apiary....	" 171
First Lessons in Beekeeping.....	" 346
Transferring Bees to Movable-Frame Hives...	" 616

BEE SUPPLY HOUSES

C. W. Aeppler Company.....	Oconomowoc, Wisconsin
Dadant and Sons.....	Hamilton, Illinois
Diamond Match Company.....	Chico, California
Walter T. Kelley Company.....	Paducah, Kentucky
Leahy Manufacturing Company.....	Higginsville, Missouri
G. B. Lewis Company.....	Watertown, Wisconsin
August Lotz Company.....	Poyd, Wisconsin
A. I. Root Company.....	Medina, Ohio
Williams Bros. Manufacturing Co.....	Portland, Oregon
A. G. Woodman Company.....	Grand Rapids, Michigan
Superior Honey Company.....	Ogden, Utah, and Los Angeles, California
Fred W. Muth Company.....	Pearl and Walnut Streets, Cincinnati, Ohio

Also see Circular E-297, "LIST OF DEALERS IN
BEEKEEPING SUPPLIES, PACKAGE BEES,
AND QUEENS."

BOOKS ON BEEKEEPING - Books for sale by bee supply houses and book dealers. Prices are approximate. For list of supply dealers see page 4. Some of these books may be in your public library.

ABC and XYZ of Bee Culture (1945).....	A. I. and E. R. Root.....	\$2.50
American Honey Plants (1930).....	Frank C. Pellett.....	3.00
Anatomy and Physiology of the Honeybee (1925).....	R. E. Snodgrass.....	3.50
Bee Venom Therapy (1935).....	Bodog F. Beck, M.D.....	5.00
Beekeeping (1928).....	E. F. Phillips.....	4.00
Beekeeping as a Hobby (1941).....	Kyle Onstott.....	2.00
Beekeeping in the South (1920).....	Kenneth Hawkins.....	1.00
Dadant System of Beekeeping..(1932).....	C. P. Dadant.....	1.00
First Lessons in Beekeeping (1938).....	C. P. Dadant.....	1.00
Five Hundred Answers to Bee Questions (1942).Geo. S. Demuth.....		.50
Golden Throng (1940).....	Edwin Way Teale.....	3.00
Honey and Your Health (1944).....	Bodog F. Beck, M.D. & Dorée Smedley.....	
Honey Getting (1944).....	E. L. Sechrist.....	1.50
Honey Plants of North America (1926).....	John H. Lovell.....	1.50
How to Succeed with Bees (1930).....	Atkins and Hawkins....	.55
Langstroth on the Hive and Honeybees (1927)....	C. P. Dadant.....	2.00
Life of the Bee (1904).....	Maurice Maeterlinck....	2.50
Living from Bees (1946).....	Frank C. Pellett.....	2.00
Outapiaries and Their Management (1919).....	M. G. Dadant.....	1.00
The Mystery of the Hive (1923).....	Eugene Evrard.....	2.50
Practical Queen Rearing (1945).....	Frank C. Pellett.....	1.00
Productive Beekeeping (1923).....	Frank C. Pellett.....	3.00
Queen Rearing Simplified (1923).....	Jay Smith.....	1.25
Scientific Queen Rearing (1899).....	C. M. Doolittle.....	.50
Starting Right with Bees (1945).....	H. G. Rowe.....	.50

(Revised by E. R. Root)

BEE JOURNALS. The following are issued monthly at \$1.00-\$1.50 per year:

American Bee Journal, Hamilton, Illinois
Beekeeper's Item, Paducah, Kentucky
Gleanings in Bee Culture, Medina, Ohio
The Beekeepers' Magazine, 3110 Piper Road,
Route 5, Lansing, Michigan

ORGANIZATIONS IN THE BEEKEEPING INDUSTRY

American Honey Institute - Mrs. Harriet M. Grace, Director, Commercial State Bank Building, Madison, Wisconsin. An organization sponsored and supported by the bee supply companies, beekeepers' organizations and individuals. Its purpose is to give publicity to honey through demonstrations, lectures, radio talks, honey recipes and other literature.

Southern States Beekeepers' Federation - An organization of honey producers, shippers of package bees and queen breeders devoted to the interest of beekeeping in the Southern States.

State Beekeepers' Organizations - A beekeepers' association exists in practically every State. Information about such associations can usually be obtained through your State Department of Agriculture or your Agricultural College or Experiment Station.

Apiary Inspectors of America.

National Federation of State Beekeepers' Associations - A national organization of beekeepers comprised of State and County beekeepers' organizations and individual beekeepers. Annual dues \$5.00; Glenn O. Jones, Secretary, Atlantic, Iowa.

The Bee Industries Association - Supply manufacturers.

National Beekeeping War Council - Representing all branches of the industry.

National Honey Association - Commercial bottlers of honey.

U. S. D. A. BEEKEEPING ACTIVITIES. All work on beekeeping by the U. S. Department of Agriculture is centered in the Division of Bee Culture Investigations of the Bureau of Entomology and Plant Quarantine. This Division has its headquarters at the Agricultural Research Center, Beltsville, Maryland, and maintains the following field laboratories:

California - Pacific States Bee Culture Laboratory, Davis, California. Geo. H. Vansell, In Charge. Cooperating with the California Agricultural Experiment Station and University of California, Berkeley, California. In cooperation with the Arizona Agricultural Experiment Station, a sub-laboratory is maintained at Tucson, Arizona, with S. E. McGregor in charge.

Louisiana - Southern States Bee Culture Laboratory, University Station, Baton Rouge, Louisiana. Warren Whitcomb, Jr., In Charge. Cooperating with the Louisiana Agricultural Experiment Station and University of Louisiana.

Wisconsin - North Central States Bee Culture Laboratory, King Hall, University of Wisconsin, Madison, Wisconsin. C. L. Farrar, In Charge. Cooperating with the Wisconsin Agricultural Experiment Station and University of Wisconsin.

Wyoming - Intermountain States Bee Culture Laboratory, Engineering Shops, University of Wyoming, Laramie, Wyoming. A. P. Sturtevant, In Charge. Cooperating with the Wyoming Agricultural Experiment Station and University of Wyoming.

ADVICE TO BEGINNERS

Beekeeping is a specialized industry requiring fundamental knowledge of bee behavior and a genuine liking for handling bees. Locating colonies close to available sources of nectar is important, since to insure good crops the bees should be within flying range, that is, 1 or 2 miles of an abundance of nectar-secreting plants. Good beekeeping locations are found in practically every State, so that the selection of apiary sites resolves itself into choosing locations where nectar-secreting plants occur in profusion and where living conditions are desirable.

With proper experience and liking for bees, a person in a favorable location can obtain from beekeeping a return that will compare favorably with that from most agricultural pursuits. Beekeeping, however, can easily result in a profitless undertaking and to avoid this we advise beginners not to invest heavily. Practical knowledge gained through a season's work with an experienced beekeeper should be invaluable to a beginner. If a person cannot spend time with a beekeeper, the next best thing is to acquire two or three colonies and do the best he can. A number of State educational institutions offer resident or correspondence courses in bee-keeping.

A common method of starting a colony is to purchase a package of bees, preferably 3 pounds, with a queen and to install this package in a hive equipped with frames containing full sheets of brood foundation.

Instructions for installing usually accompany the package, which may be ordered (See Circular E-297, "List of Dealers in Beekeeping Supplies, Package Bees, and Queens") sent either by parcel post or by express.

The best time to begin beekeeping with either package bees or established colonies is in the spring when fruit trees are in bloom.

If established colonies are purchased, they should be (1) in modern hives, (2) acquired from a reliable beekeeper, and (3) accompanied by a certificate of inspection to insure freedom from disease.

A beginner's outfit may consist of the following items, although it is suggested that catalogs from some of the bee supply houses be consulted for comparable information:

1 10-frame hive, consisting of:	1 3-lb. pkg. of bees with queen
1 bottom board	1 smoker
2 10-frame hive bodies complete	1 bee veil
with frames and brood foundation	1 hive tool
2 to 4 shallow supers complete with	10-15 lbs. granulated sugar
frames and thin super foundation	4 oz. No. 28-gauge wire
1 outer cover and 1 inner cover	Spur imbedder

Such outfits, including a subscription to a bee journal, cost approximately \$20. The equipment can be varied and more can be added after a person has become experienced and learns how to manage large colonies. The standard 10-frame hive is the type generally used in the United States.

While ordinarily more satisfactory results will be had with factory-made equipment, some beekeepers prefer to construct their own beehives. If this is done, it is a good plan to purchase or borrow a complete hive to use as a model. It is essential that all dimensions be carefully adhered to, otherwise the bees will build combs and add propolis where it is not desired. Likewise careful construction is necessary so that all hive parts are readily interchangeable.

The Italian bee is the kind recommended for the beginner in this country. It is hardy, industrious, fairly gentle, and can be readily obtained in pure stock since it is the bee most commonly kept in the United States.

You should consult your Agricultural College, State Department of Agriculture, or Agricultural Experiment Station for information on State beekeeping publications, extension work in beekeeping, inspection service, good beekeeping locations, beekeeping associations, and the like.

CARDINAL POINTS TO BE OBSERVED IN KEEPING BEES

1. Bees need in the spring an abundant store of honey (15 or more pounds at all times) and pollen, plenty of room for brood rearing, a source of water, protection from the wind and exposure to sunlight.
2. Swarming results in the loss of honey, is undesirable and should be controlled.
3. There should be empty comb space in the hives at all times preceding and during a honey flow. If every cell becomes occupied with brood, pollen or honey, the bees will swarm or stop working, either of which causes a loss of honey if it occurs just before or during a flow.
4. For successful wintering a colony should have a young queen of high producing stock, a large cluster of young, fall-raised bees, 60 or more pounds of sealed honey, and several combs containing large areas of pollen. For these requirements a colony must have a 2-story standard hive with a gross weight in October of about 130 pounds.
5. It is unprofitable and, in many States, illegal to keep bees in box hives or "gums."
6. It does not pay to cultivate any plant for bees alone. Nectar resources may be improved, however, by planting such crops as sweet clover on wastelands.



CARDINAL POINTS TO BE OBSERVED IN KEEPING BEES (continued)

7. Starvation is one of the principal causes of unprofitable beekeeping. If bees are short of honey stores, a syrup of two parts of clean granulated sugar to one of water should be fed. Plan carefully and avoid feeding by leaving the bees plenty of honey at all times.
8. Diseases of bees cause large annual losses of bees, honey and equipment. Beekeepers should learn to recognize the symptoms, particularly of American foulbrood.

DISEASES OF BEES

While it is normal to find a few dead bees at the entrance of a hive, the presence of large numbers should cause the beekeeper to examine the colony for some abnormal condition. The presence of trembling or paralyzed bees, or bees crawling and apparently unable to fly, should arouse suspicion. Two of the commonest abnormal conditions of adult bees are poisoning by insecticides and Nosema disease. Bees suffering from these two and other abnormal conditions may all appear to behave alike. A laboratory diagnosis can be made for Nosema disease and insecticide poisoning; although, at times, making a diagnosis of any abnormal condition of adult bees must include actual observation of the colony affected.

In many parts of the country beekeepers suffer losses from American or European foulbrood, the two most serious brood diseases. European foulbrood can be controlled by proper corrective measures, but American foulbrood, the more serious and prevalent of the two, requires a more drastic treatment. The bees and combs of colonies infected with American foulbrood should be burned.

Apiary inspection is a function of the States, and is maintained by most State Departments of Agriculture, to which should be referred all questions concerning apiary inspection, diagnoses, and proper methods of control. As a service to beekeepers, however, the Division of Bee Culture examines, without cost, samples of brood and adult bees. Reports of these diagnoses are sent to the beekeepers in question, with a copy to the proper State apiary officials.

For diagnosing brood diseases, send a sample of comb about 4" x 4" containing the affected brood or brood remains. Avoid including any honey if possible. In the case of adult bees, send from 100 to 200 (preferably the latter) sick or dead bees. Mail all samples in a wooden or heavy cardboard box. Do not use tin, glass, or waxed paper. Address all samples to: Division of Bee Culture, Agricultural Research Center, Beltsville, Maryland.